

# NASA TECH BRIEF

## Kennedy Space Center



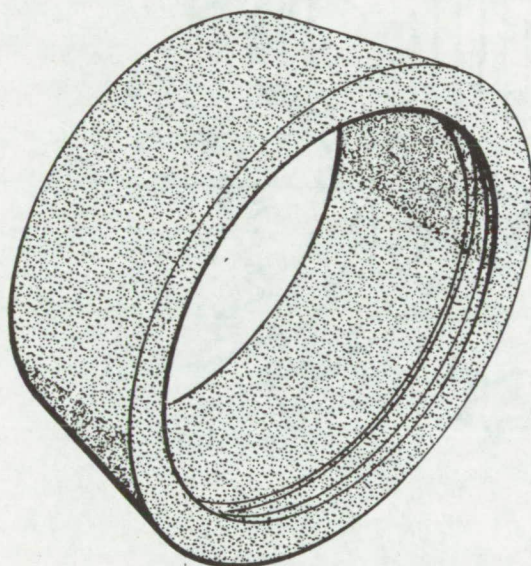
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### Insulation Assembly Uses Cryopumping to Reduce Heat Transfer in Cryogenic Liquid Line

A flush joint coupling employing a foil jacketed annular cone, backfilled with  $\text{CO}_2$ , eliminates the inherent connection problems of conventional bayonet type joints used for vacuum jacketed as-

semblies. and restricts heat leak to a calculated level of 362 kJ (344 Btu/hr.) for a 20.32 cm (8 in.) joint assembly.

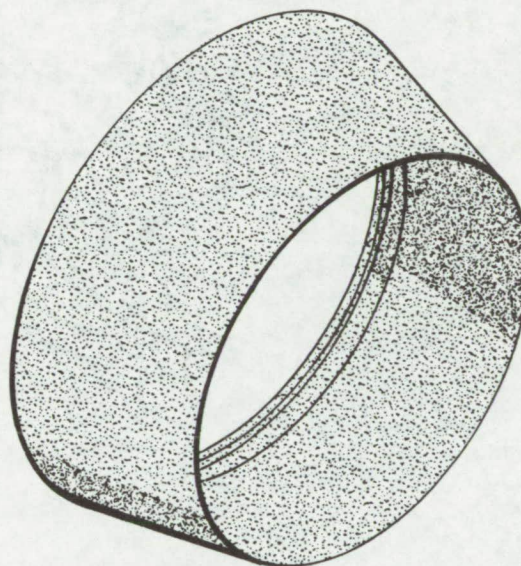
The bayonet member has an inward facing liquid



Male Block

semblies. The open celled foam (see fig.) is contained in the stainless steel foil jacket. The foam is evacuated and then backfilled with the condensing gas, which will cryopump during passage of the liquid hydrogen through the line. This reduces the heat transfer to essentially that of the evacuated foam.

In this application, open cell foam is backfilled with  $\text{CO}_2$ , which condenses at cryogenic temperatures. During cryogenic liquid transfer, the vacuum tight shroud of stainless steel sheet seals the joint



Female Block

lip seal. During assembly chilldown, the sealing surfaces tend to be pulled away from the seal. However, due to internal spring loading, the material follows and maintains the sealing contact. Four 0.076 cm (0.030 in.) diameter holes are drilled through the liquid seal to allow for pressure equalization. An ambient gas-tight hexagonal ring seal is installed in the flange assembly outside the annular cone.

(continued overleaf)

**Note:**

Requests for further information may be directed to:

Technology Utilization Officer  
Code AD-PAT  
Kennedy Space Center  
Kennedy Space Center, Florida 32899  
Reference: B71-10364

**Patent status:**

No patent action is contemplated by NASA.

Source: R. C. Mursinna of  
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